

REMARKS

Allowed Claims

The allowance of claims 3-11, 13, 14, 33, and 35-38 is acknowledged with appreciation.

Allowable Claims 15-21, 23 and 25-31

The indication that claims 15-21, 23, and 25-31 would be allowed if rewritten in independent form is acknowledged with appreciation.

Claim 15 has been amended to place it in independent form and includes all the elements of claim 32 on which it was directed dependent when deemed to define allowable subject matter. Accordingly, claim 15 is believed to now be in a proper form and condition for allowance and to define novel and patentable subject matter under §102 and 103 for at least the reasons for which it was previously deemed to be allowable.

Each of claims 16-21, 23 and 25-31 is ultimately dependent on amended claim 15. Accordingly, each of these claims is now in a proper form and condition for allowance and defines novel and patentable subject matter for at least the reasons for which each of these dependent claims was previously deemed to do so.

Claim Rejection

The remaining claims 1, 2, 32 and 39 were rejected only under §103 as being unpatentable over Reef in view of Fournier.

Reef U.S. Patent 5,667,366

Reef discloses a fuel pump module having a reservoir 16, a high pressure pump 14 and a jet pump 10 with a nozzle 46 having an inlet supplied with fuel through a return line 20 from the engine. As indicated in the Office Action, Reef does not disclose, have or teach any restrictor plate at all.

Fournier U.S. Patent 5,647,328

Fournier discloses a fuel pump module 10 with an electric high pressure fuel pump 14 with an inlet which communicates with a fuel tank 12 and an outlet 20 which supplies high pressure fuel to the engine through a by-pass pressure regulator 22. In operation, the electric fuel pump 14 delivers through its outlet 20 a greater quantity of fuel than that consumed by the engine and to regulate the pressure of fuel supplied to the engine, the regulator 22 discharges excess fuel through its outlet 28 directly into a reservoir canister 26. The bottom 30 of the reservoir has an orifice 90 therein which controls the rate at which fuel passes out of the bottom of the reservoir (Col 10, Lines 4-8). The orifice 90 is sized so that the reservoir 26 will be substantially completely filled by the excess fuel discharge from the outlet 28 of the pressure regulator during normal operation of the pump module (Col 10, Lines 8-23). When the fuel tank is almost empty, the fuel passing through the orifice 90 flows through the filter 18 and into the inlet 16 of the electric fuel pump to supply fuel to the engine. When the electric pump is first turned off, fuel passing through the orifice backwashes the filter to clean it.

Incorrect Interpretation of the Fournier U.S. Patent 5,647,328

Applicants respectfully submit that the interpretation of Fournier set forth in the Office Action is wrong and that persons of ordinary skill in the art would understand that it is wrong and that the correct interpretation of Fournier is set forth in the above paragraph. If, after considering the following further discussion of Fournier, the Examiner is of the view that the interpretation of Fournier set forth in the Office Action is correct, the Examiner is asked to clearly identify the specific portions of the Fournier reference by column and line number and/or quotation on which reliance is placed for the interpretation set forth in the Office Action. Only with this additional information can applicants give further consideration to the interpretation set forth in the Office Action.

Contrary to the contention in the Office Action, the outlet 28 of the by-pass pressure regulator 22 is not a jet pump nozzle or a jet pump at all. As indicated in the attached definition from the McGraw-Hill dictionary of Science and Technical Terms, 5th Edition, published in 1994, a jet pump is a “pump in which an accelerating jet entrains a second fluid to deliver it at elevated pressure” and a jet nozzle is “a nozzle, usually specially shaped, for producing a jet, such as the exhaust nozzle on a jet or rocket engine”. Therefore, skilled persons know and understand that a jet pump and a nozzle or jet nozzle of a jet pump have a different structure and perform a different function than the outlet 28 of a by-pass pressure regulator which simply dumps the excess fuel (at relatively low pressure) back into the reservoir.

Contrary to the contention in the Office Action, the bottom plate 30 with the orifice 90 therein are not between the outlet 20 of the high pressure pump 14 and the inlet 96 of the pressure regulator 22. Contrary to the contention in the Office Action, the

outlet 20 of the high pressure pump 14 does not communicate with and supply fuel to the inlet of any nozzle of any jet pump. Rather, the outlet 20 of the high pressure fuel pump 14 supplies fuel to the engine through the conduit 24 and to the inlet of the pressure regulator 22 through the housing 96.

Contrary to the contention in the Office Action, the plate 30 with the orifice 90 therein is not between the high pressure outlet 20 of the electric fuel pump 14 and the inlet 96 of the by-pass pressure regulator 22. Rather, the plate 30 and orifice 90 are in the bottom of the reservoir can 26 and therefore downstream of all of the high pressure pump outlet 20, pressure regulator inlet 22 and pressure regulator outlet 28, are not connected to any of them, and does not receive high pressure fuel from the outlet 20 of the electric fuel pump 14.

Amended Claim 1

Claims 1 has been further amended to even more clearly define and distinguish applicants' patentable invention from the proposed combination of the Reef and Fournier references. As amended, claim 1 defines a fuel pump module having, among other things, a reservoir, a high pressure fuel pump with an inlet and an outlet of pressurized fuel, a jet pump having a fuel inlet, a fuel outlet supplying fuel to the reservoir, and a nozzle having an outlet and an inlet in communication with and receiving fuel from the high pressure outlet of the pump for fuel flow through the inlet and outlet of the nozzle to entrain fuel through the inlet of the jet pump and discharge the entrained fuel through the outlet of the jet pump and into the reservoir, and at least one restrictor plate received between the inlet of the jet nozzle and the high pressure outlet of the fuel pump and

having an orifice upstream of the inlet of the nozzle and restricting the flow of the fuel to the inlet of the nozzle.

Amended Claim 1 is Patentable

As amended, claim 1 defines patentable subject matter under §103 over the proposed combination of references because they do not disclose, suggest or teach to skilled persons applicants' specific concept, construction and arrangement as defined by amended claim 1 nor its significant practical advantages. These references, whether considered alone or in combination, do not disclose, suggest or teach to skilled persons applicants' specific concept of a fuel pump module with a jet pump having a nozzle with an inlet receiving fuel from the outlet of a high pressure pump and having a restrictor plate between this pump outlet and this inlet of the nozzle with an orifice restricting the flow of fuel from the pump through the nozzle. This specific construction has the significant practical advantages of increasing the efficiency of the fuel pump module and under maximum engine fuel demand conditions delivering a greater portion of the high pressure fuel output of the electric pump to the engine to meet its peak fuel demand, reduces noise and power consumption of the fuel system, greatly improves the output of the fuel system during cold weather cold engine start-up and warm-up conditions and is of simple design and economical and manufacture assembly.

Furthermore, the proposed combination of these references does not teach this specific construction and arrangement. Indeed, the Reef reference does not disclose any restricted orifice at all, much less a jet pump and a jet nozzle having an orifice restricting the flow of high pressure fuel from the electric pump into and through the nozzle of the

jet pump. Furthermore, as would be interpreted by persons of ordinary skill in the art, the Fournier reference does not disclose, suggest or teach to skilled persons any jet pump at all or any jet pump having a jet nozzle with an orifice restricting the flow of high pressure fuel from the outlet of the electric pump through the nozzle of the jet pump. To the contrary, Fournier teaches away from applicants' invention because it does not disclose any jet pump at all and merely shows a reservoir can having an orifice in its bottom to control when the system is operating the rate at which the reservoir can is filled with fuel and in extreme low fuel level conditions in the fuel tank to supply fuel to the inlet of the high pressure pump and when the system is not operating, to back flush the filter by fuel flowing out of the reservoir through the orifice.

Furthermore, since neither of these references disclose applicants' specific concept, or any construction and arrangement for achieving applicants' concept, nor its significant practical advantages, they must have been selected and their combination proposed utilizing the teachings of applicants' invention which hindsight selection, interpretation and application of the prior art is explicitly prohibited in applying the non-obviousness test of §103. Furthermore, neither of these references nor the skill of the art provides any motivation for combining them and even if combined, they do not achieve applicants' specific construction and arrangement as defined by amended claim 1 for at least the foregoing reasons. Accordingly, reconsideration and allowance of claim 1 as amended is respectfully requested.

Claim 2

Claim 2 is dependent on claim 1 and hence defines patentable subject matter under §103 over the Reef and Fournier references for at least the foregoing reasons for which claim 1 does so and should be allowed.

Claim 32

Amended claim 32 is broader in some respects than amended claim 1 but nevertheless is believed to define patentable subject matter under §103 over the Reef and Fournier references for essentially at least the foregoing reasons for which amended claim 1 does so. Accordingly, reconsideration and allowance of amended independent claim 32 is requested.

Claim 39

Claim 39 is dependent on claim 32 and hence defines patentable subject matter under §103 for at least the foregoing reasons for which claim 32 does so.

Conclusion

The allowance of claims 3-11, 13, 14, 33 and 35-38 is acknowledged with appreciation. The indication that claims 15-21, 23 and 25-31 would be allowed if rewritten in independent form is acknowledged with appreciation and since claim 15 has been rewritten in independent form, all of these claims are believed to now be in a proper form and condition for allowance.

The remaining claims 1, 2, 32 and 39 as further amended therein are believed to define novel and patentable subject matter under §§102 and 103 for at least the foregoing reasons and reconsideration and allowance thereof as amended is respectfully requested.

If after considering this Response the Examiner is of the view that any of the claims are not in a condition for allowance, a telephone interview with applicants' undersigned attorney William Francis is requested so that immediate consideration can be given to any further amendments suggested by the Examiner or otherwise needed to place all the claims in a condition for allowance. The Examiner is asked to either schedule or initiate this interview by telephoning William Francis at 248-689-3500, Ext 153, who normally can be reached Monday through Friday between 9 a.m. and 5 p.m.

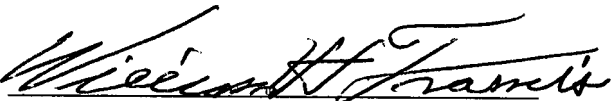
A check in the amount of \$200.00 to cover the cost of the additional independent claim is enclosed herewith. If the Patent Office calculation indicates the amount of this check is incorrect, please charge any deficiency or credit any excess to our Deposit Account No. 50-0852.

Respectfully submitted,

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WHF:sal

Enclosures

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McGraw-Hill Dictionary of Scientific and Technical Terms

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Editor in Chief

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**On the cover: Photomicrograph of crystals of vitamin B₁.
(Dennis Kunkel, University of Hawaii)**

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In addition, material has been drawn from the following references: R. E. Huschke, *Glossary of Meteorology*, American Meteorological Society, 1959; *U.S. Air Force Glossary of Standardized Terms*, AF Manual 11-1, vol. 1, 1972; *Communications-Electronics Terminology*, AF Manual 11-1, vol. 3, 1970; W. H. Allen, ed., *Dictionary of Technical Terms for Aerospace Use*, 1st ed., National Aeronautics and Space Administration, 1965; J. M. Gilliland, *Solar-Terrestrial Physics: A Glossary of Terms and Abbreviations*, Royal Aircraft Establishment Technical Report 67158, 1967; *Glossary of Air Traffic Control Terms*, Federal Aviation Agency; *A Glossary of Range Terminology*, White Sands Missile Range, New Mexico, National Bureau of Standards, AD 467-424; *A DOD Glossary of Mapping, Charting and Geodetic Terms*, 1st ed., Department of Defense, 1967; P. W. Thrush, comp. and ed., *A Dictionary of Mining, Mineral, and Related Terms*, Bureau of Mines, 1968; *Nuclear Terms: A Glossary*, 2d ed., Atomic Energy Commission; F. Casey, ed., *Compilation of Terms in Information Sciences Technology*, Federal Council for Science and Technology, 1970; *Glossary of Stinfo Terminology*, Office of Aerospace Research, U.S. Air Force, 1963; *Naval Dictionary of Electronic, Technical, and Imperative Terms*, Bureau of Naval Personnel, 1962; *ADP Glossary*, Department of the Navy, NAVSO P-3097.

McGRAW-HILL DICTIONARY OF SCIENTIFIC AND TECHNICAL TERMS, Fifth Edition

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crusher for coal, with a drum to which are bolted toothed segments designed to grip the coal, thus forcing it down into the crushing opening. { 'jef-rē 'sɪŋ-gəl, rōl, krəsh-ər }

Jeffrey swing-hammer crusher [MIN ENG] A crusher with swing arms on a revolving shaft for crushing coal, ore, or other material against the iron casing of the crusher; a screen at the bottom allows sufficiently fine pieces to pass through. { 'jef-rē 'swɪŋ, ham-ər, krəsh-ər }

Jeffrey-Taylor vibrating feeder [MIN ENG] A feed chute vibrated electromagnetically in a direction oblique to its surface; rate of movement of rock depends on amplitude and frequency of vibration. { 'jef-rē 'trā-lər, vī, brād-ɪŋ 'fēd-ər }

Jeffrey-Taylor vibrating screen [MIN ENG] A vibrating screen whose action results from an oscillating armature and a stationary coil. { 'jef-rē 'trā-lər, vī, brād-ɪŋ 'skrēn }

jejunitis [MED] Inflammation of the jejunum. { jē-jə'nīd-əs }

jejunostomy [MED] The making of an artificial opening through the abdominal wall into the jejunum. { jē-jə'nās-tō-mē }

jejunum [ANAT] The middle portion of the small intestine, extending between the duodenum and the ileum. { jē'jū-nəm }

jellied gasoline See gelatinized gasoline. { 'jel-ēd 'gas-ə, lēn }

jelly See ulmin. { 'jel-ē }

jellyfish [INV ZOO] Any of various free-swimming marine cnidarians belonging to the Hydrozoa or Scyphozoa and having a bell- or bowl-shaped body. Also known as medusa. { 'jel-ē, fɪʃ }

jelly fungus [MYCOL] The common name for many members of the Heterobasidiomycetidae, especially the orders Tremellales and Dacromycetales, distinguished by a jellylike appearance or consistency. { 'jel-ē, fəŋ-'gəs }

jelutong See pontianak gum. { 'jel-ə, tɒŋ }

Jennerian vaccine See smallpox vaccine. { jən'nir-ē-ən vak'sēn }

Jenner's stain See May-Grünwald stain. { 'jen-ərz, stān }

jenny [VERT ZOO] 1. A female animal, as a jenny wren. 2. A female donkey. { 'jen-ē }

Jensen's inequality [MATH] 1. A general inequality satisfied by a convex function

$$f\left(\sum_{i=1}^n a_i x_i\right) \leq \sum_{i=1}^n a_i f(x_i)$$

where the x_i are any numbers in the region where f is convex and the a_i are nonnegative numbers whose sum is equal to 1. 2. If a_1, a_2, \dots, a_n are positive numbers and $s > t > 0$, then $(a_1^s + a_2^s + \dots + a_n^s)^{1/s}$ is less than or equal to $(a_1^t + a_2^t + \dots + a_n^t)^{1/t}$. { 'jen-sənz, 'ɪnɪ'kwāl-ədē }

Jensen's sarcoma [VET MED] A transmissible malignant tumor originally observed in a rat inoculated with acid-fast bacteria from a cow with pseudotuberculous enteritis. { 'jen-sənz sār'kō-mə }

Jeppel's oil See bone oil. { 'jep-əlz, ɔɪl }

jerboa [VERT ZOO] The common name for 25 species of rodents composing the family Dipodidae; all are adapted for jumping, having extremely long hindlegs and feet. { jər'bō-ə }

jeremejevite [MINERAL] AlBO_3 A colorless or yellowish mineral composed of aluminum borate that occurs in hexagonal crystals. { ,jer-ə'mā-ə, vīt }

Jeremiasen crystallizer [CHEM ENG] Device used to grow solid crystals in a supersaturated liquid solution and to separate them from it. { ,jer-ə'mī-əsən 'krɪst-əl, ɪz-ər }

jerk [MECH] 1. The rate of change of acceleration; it is the third derivative of position with respect to time. 2. A unit of rate of change of acceleration, equal to 1 foot (30.48 centimeters) per second squared per second. { jərk }

jerk line [PETRO ENG] A line that radiates from a common point of power to the jack of several wells, permitting the wells to be pumped by a single power unit. { 'jərk-ər, lɪn }

jerk in head [ARCH] Section of a roof hipped for only part of its height, forming a truncated gable on the wall below. { 'jərk-ən, həd }

jerk pump [MECH ENG] A pump that supplies a precise amount of fuel to the fuel injection valve of an internal combustion engine at the time the valve opens; used for fuel injection. { 'jərk, pəmp }

jerry can [ORD] A 5-gallon (19-liter), flat-sided, narrow can

adapted from a German-made can, easily stacked and transported, and adapted by special openings for discharging fuel. { 'jer-ē, kan }

jersey [TEXT] A knitted wool, cotton, polyester, rayon, or other fabric with a slight rib on one side. { 'jər-zē }

jet [ASTRON] A narrow, elongated feature in the radio or optical map of an active galaxy, quasar, or object in the Milky Way Galaxy, believed to represent an energetic outflow of gas from a compact astronomical object. [FL MECH] A strong, well-defined stream of compressible fluid, either gas or liquid, issuing from an orifice or nozzle or moving in a contracted duct. [PARTIC PHYS] A group of particles issuing in approximately the same direction from a high-energy collision of elementary particles, believed to consist of decay products of a member of a quark-antiquark pair created in the collision. { jet }

jet aircraft [AERO ENG] An aircraft with a jet engine or engines. { 'jet 'er, kraft }

jet bit [DES ENG] A modification of a drag bit or a roller bit that utilizes the hydraulic jet principle to increase drilling rate. { 'jet 'bit }

jet boat [NAV ARCH] A boat propelled by one or more engines that expel powerful jets of water. { 'jet, bōt }

jet coal [GEOL] A hard, lustrous, pure black variety of lignite, occurring in isolated masses in bituminous shale; thought to be derived from waterlogged driftwood. Also known as black amber. { 'jet, kōl }

jet compressor [MECH ENG] A device, utilizing an actuating nozzle and a combining tube, for the pumping of a compressible fluid. { 'jet kəm, pres-ər }

jet condenser [MECH ENG] A direct-contact steam condenser utilizing the aspirating effect of a jet for the removal of noncondensables. { 'jet kən, den-sər }

jet drilling [MECH ENG] A drilling method that utilizes a chopping bit, with a water jet run on a string of hollow drill rods, to chop through soils and wash the cuttings to the surface. Also known as wash boring. { 'jet, drɪl-ɪŋ }

jet-effect wind [METEOROL] A wind which is increased in speed through the channeling of air by some mountainous configuration, such as a narrow mountain pass or canyon. { 'jet i, fekt, wɪnd }

jet engine [AERO ENG] An aircraft engine that derives all or most of its thrust by reaction to its ejection of combustion products (or heated air) in a jet and that obtains oxygen from the atmosphere for the combustion of its fuel. [MECH ENG] Any engine that ejects a jet or stream of gas or fluid, obtaining all or most of its thrust by reaction to the ejection. { 'jet, en-jən }

jet-flame drill [MIN ENG] A mining drill that utilizes a high-velocity flame to spall out a hole. { 'jet, flām, drɪl }

jet flap [AERO ENG] A sheet of fluid discharged at high speed close to the trailing edge of a wing so as to induce lift over the whole wing. { 'jet 'flap }

jetfoil [NAV ARCH] A hydrofoil craft propelled by one or more gas turbine engines that expel powerful jets of water. { 'jet, fōɪl }

jet fuel [MATER] Special grade of kerosine with a flash point of 125°F (52°C), used for jet aircraft; may have methane or naphthene added to produce a 110°F (43°C) flash point, for military aircraft. { 'jet 'fjūəl }

jet hole [ENG] A borehole drilled by use of a directed, forceful stream of fluid or air. { 'jet, hōl }

jet-membrane method [NUCLEO] A method of uranium isotope separation in which a rarefied vapor jet interacts with a background gas of uranium hexafluoride, causing preferential diffusion of uranium-235 into the jet; the enriched gas is extracted from the interaction region between the jet and the uranium hexafluoride by using small channels. { 'jet 'mem, bræn, meth-əd }

jet mill See fluid-energy mill. { 'jet, mɪl }

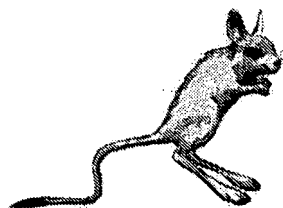
jet mixer [MECH ENG] A type of flow mixer or line mixer, depending on impingement of one liquid on the other to produce mixing. { 'jet 'mɪks-ər }

jet molding [ENG] Molding method in which most of the heat is applied to the material to be molded as it passes through a nozzle or jet, rather than in a conventional heating cylinder. { 'jet, mōl-dɪŋ }

jet nozzle [DES ENG] A nozzle, usually specially shaped, for producing a jet, such as the exhaust nozzle on a jet or rocket engine. { 'jet, nāz-əl }

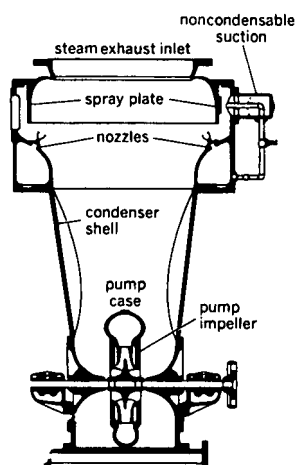
jet-piercing drill See fusion-piercing drill. { 'jet 'pɪrsɪŋ, drɪl }

JERBOA



Jerboa, with body 3-6 inches (7-15 centimeters) long and tail up to 8 inches (20 centimeters) long.

JET CONDENSER



A low-level jet condenser. (C. H. Wheeler Manufacturing Co.)

jet propulsion

jet propulsion [AERO ENG] The propulsion of a rocket or other craft by means of a jet engine. [ENG] Propulsion by means of a jet of fluid. { 'jet prə'pəl'shən }

jet pump [MECH ENG] A pump in which an accelerating jet entrains a second fluid to deliver it at elevated pressure. { 'jet ,pʌmp }

jetsam [ENG] Articles that sink when thrown overboard, particularly those jettisoned for the purpose of lightening a vessel in distress. { 'jet'səm }

jet spinning [ENG] Production of plastic fibers in which a directed blast or jet of hot gas pulls the molten polymer from a die lip; similar to melt spinning. { 'jet ,spɪn-ɪŋ }

jet streak [METEOROL] A region within the jet stream exhibiting wind speeds higher than the jet stream itself. { 'jet ,streɪk }

jet stream [AERO ENG] The stream of gas or fluid expelled by any reaction device, in particular the stream of combustion products expelled from a jet engine, rocket engine, or rocket motor. [METEOROL] A relatively narrow, fast-moving wind current flanked by more slowly moving currents; observed principally in the zone of prevailing westerlies above the lower troposphere, and in most cases reaching maximum intensity with regard to speed and concentration near the troposphere. { 'jet ,streɪm }

jetting [CIV ENG] A method of driving piles or well points into sand by using a jet of water to break the soil. [ENG] During molding of plastics, the turbulent flow of molten resin from an undersized gate or thin section into a thicker mold section, as opposed to laminar, progressive flow. { 'jed-ɪŋ }

jetting tool [PETRO ENG] Downhole device that jets a high-pressure, sand-laden fluid stream to clean out wellbore holes, to disintegrate perforating pipe, and to perform other operations. { 'jed-ɪŋ ,tʊl }

jettison [ENG] The throwing overboard of objects, especially to lighten a craft in distress. { 'jed-ə'sən }

jet tones [ACOUS] Unsteady tones produced when a stream of air issues into still air from an orifice. { 'jet ,tənz }

jetty See groin. { 'jed-ē }

Jevons effect [METEOROL] The effect upon the measurement of rainfall caused by the presence of the rain gage; in 1861 W.S. Jevons pointed out that the rain gage causes a disturbance in airflow past it, and this carries part of the rain past the gage which would normally be captured. { 'jev-ənz i,fekt }

jewel [ENG] 1. A bearing usually made of synthetic corundum and used in precision timekeeping devices, gyros, and other instruments. 2. A bearing lining of soft metal, used in railroad cars, for example. { 'jʊl }

jeweler's rouge See ferric oxide. { 'ju:lərz 'ru:ʒ }

jewelry alloy [MET] Any ductile, malleable alloy, usually bronze, of good corrosion resistance, used as a base metal in jewelry. { 'ju:l-rē ,al,oi }

jezekite See morinite. { 'jez-ə,kɪt }

J factor [THERMO] A dimensionless equation used for the calculation of free convection heat transmission through fluid films. { 'jə ,fækt-ər }

JFET See junction field-effect transistor. { 'jə,fet }

J function [GEOPHYS] A dimensionless mathematical relationship to correlate capillary pressure data of similar geologic formations. { 'jə ,fæŋk'shən }

jib [NAV ARCH] A triangular sail bent to a foremast stay. { 'jɪb }

jib boom [MECH ENG] An extension that is hinged to the upper end of a crane boom. [NAV ARCH] A spar used as an extension of the bowsprit on sailing ships. { 'jɪb ,būm }

jib crane [MECH ENG] Any of various cranes having a projecting arm (jib). { 'jɪb ,kræn }

jib end [MIN ENG] The delivery end in conveyor systems in which a jib is fitted to deliver the load in advance of and remote from the drive. { 'jɪb ,end }

jig [ENG] A machine for dyeing piece goods by moving the cloth at full width (open width) through the dye liquor on rollers. [MECH ENG] A device used to position and hold parts for machining operations and to guide the cutting tool. [MIN ENG] A vibrating device in which coal is cleaned and ore is concentrated in water. { 'jɪg }

jig back [MECH ENG] An aerial ropeway with a pair of containers that move in opposite directions and are loaded or stopped alternately at opposite stations but do not pass around the terminals. Also known as reversible tramway; to-and-fro ropeway. { 'jɪg ,bak }

jig borer [MECH ENG] A machine tool resembling a vertical milling machine designed for locating and drilling holes in jigs. { 'jɪg ,bɔr-ər }

jigger See jiggering conveyor. { 'jɪg-ər }

jigger boss [MIN ENG] A first-line supervisor in some western United States mines. { 'jɪg-ər ,bɒs }

jiggering [ENG] A mechanization of the ceramic-forming operation consisting of molding the outside of a piece by throwing plastic clay on a plaster of paris mold, placing the mold and clay on a rotating head, and forming the inner surface by forcing a template or jigger knife against the clay; method used in mass-producing dinnerware. { 'jɪg-ər-ɪŋ }

jigging [MIN ENG] A gravity method which separates mineral from gangue particles by utilizing an effective difference in settling rate through a periodically dilated bed. { 'jɪg-ɪŋ }

jigging conveyor [MIN ENG] A series of steel troughs suspended from the roof of the stope or laid on rollers on its floor, and given reciprocating motion mechanically, to move mineral. Also known as chute conveyor; jigger; pan conveyor. { 'jɪg-ɪŋ kən,vā-ər }

jig grinder [MECH ENG] A precision grinding machine used to locate and grind holes to size, especially in hardened steels and carbides. { 'jɪg ,grɪn-dər }

jigsaw [MECH ENG] A tool with a narrow blade suitable for cutting intricate curves and lines. { 'jɪg,sɔ }

jig washer [MIN ENG] A coal or mineral washer for relatively coarse material; the broken ore is placed on a screen and pulsed vertically with water; the heavy portion passes through the screen and the light portion goes over the sides. { 'jɪg ,wəsh-ər }

jim crow [DES ENG] A device with a heavy buttress screw thread used for bending rails by hand. { 'jɪm 'krɔ }

Jimsonweed [BOT] *Datura stramonium*. A tall, poisonous annual weed having large white or violet trumpet-shaped flowers and globose prickly fruits. Also known as apple of Peru. { 'jɪm-sən,wed }

J indicator See J scope. { 'jə ,ɪn-də,kād-ər }

Jird [VERT ZOO] Any one of the diminutive rodents composing related species of the genus *Meriones* which are inhabitants of northern Africa and southwestern Asia; they serve as experimental hosts for studies of schistosomiasis. { 'jərd }

JIT See just-in-time.

jitter [COMMUN] In facsimile, distortion in the received copy caused by momentary errors in synchronism between the scanner and recorder mechanisms; does not include slow errors in synchronism due to instability of the frequency standards used in the facsimile transmitter and recorder. [ELECTR] Small, rapid variations in a waveform due to mechanical vibrations, fluctuations in supply voltages, control-system instability, and other causes. { 'jɪd-ər }

jittered pulse recurrence frequency [COMMUN] Random variation of the pulse repetition period; provides a discrimination capability against repeater-type jammers. { 'jɪd-ərd ,pəls ri:'kərəns frē'kwən-sē }

J-coupling [ATOM PHYS] A process for building up many-electron wave functions; the spin and orbital functions of each particle are combined to form eigenfunctions of the particle's total angular momentum, and then the wave functions of all the particles are combined to form eigenfunctions of the total angular momentum of the system; this coupling is used when the spin-orbit interaction is strong compared to the electrostatic interaction. { 'jə'jə ,kəplɪŋ }

J-K flip-flop [ELECTR] A storage stage consisting only of transistors and resistors connected as flip-flops between input and output gates, and working with charge-storage transistors; gives a definite output even when both inputs are 1. { 'jə'kə 'flɪp ,flɒp }

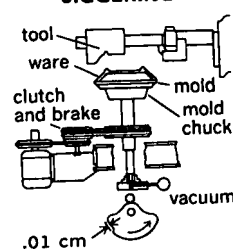
Jnd See just-noticeable difference.

joaquinite [MINERAL] $\text{NaBa}_2\text{Ce}_2\text{Fe}(\text{Ti,Nb})_2\text{Si}_8\text{O}_{26}(\text{OH,F})_2$ A honey-yellow mineral composed of sodium iron titanium silicate, occurring in orthorhombic crystals. { wə'kɪn,ɪt }

job [COMPUT SCI] A unit of work to be done by the computer; it is a single entity from the standpoint of computer installation management, but may consist of one or more job steps. [IND ENG] 1. The combination of duties, skills, knowledge, and responsibilities assigned to an individual employee. 2. A work order. { 'jɒb }

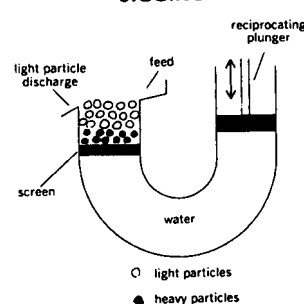
job analysis [IND ENG] A detailed study of the work performed, the facilities required, the working conditions, and the

JIGGERING



The jiggering tool and cam-raised jiggering apparatus used for plastic forming of clay. (From W. D. Kingery, ed., *Ceramic Fabrication Processes*, Technology Press, MIT, and Wiley, 1958)

JIGGING



The principle of the jigging method for beneficiation of ore.